DBPLUS
better performance

DBPLUS Performance Monitor description of changes in version 2018.1.1

Date: 4 June 2018

DBPLUS
better performance

Table of Contents

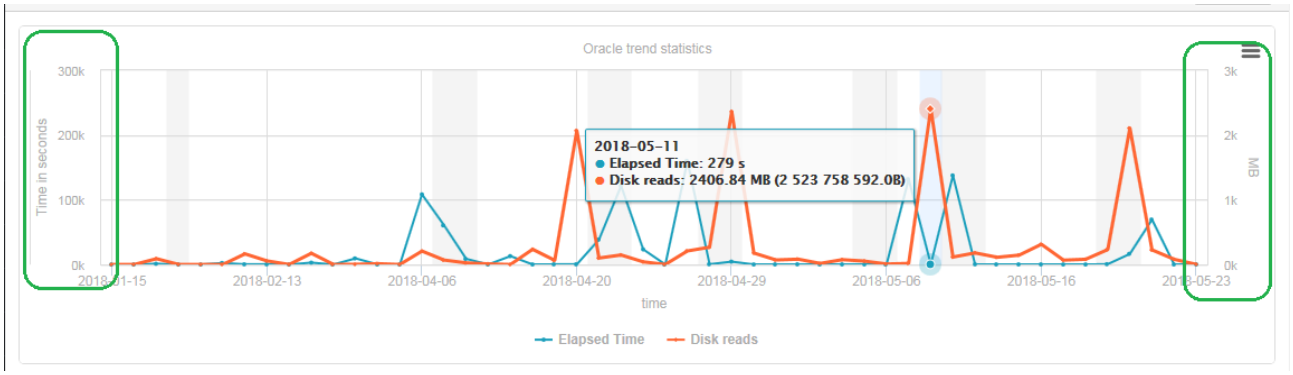
Presented below are changes in DBPLUS Performance Monitor system for monitoring Oracle databases.

1 New features in version 2018.1.1

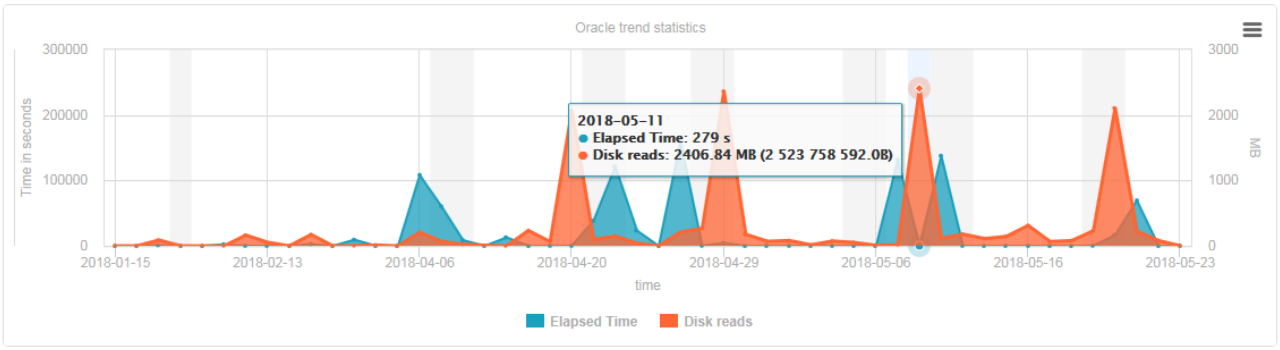
1.1 *Formatting vertical axis labels on charts*

In previous versions of the system, large figures were abbreviated – in some situations the shortened numbers could misrepresent the actual values, e.g. 3M value on Y axis for Disk Reads [MB] statistic.

The following chart features abbreviations used for large figures:



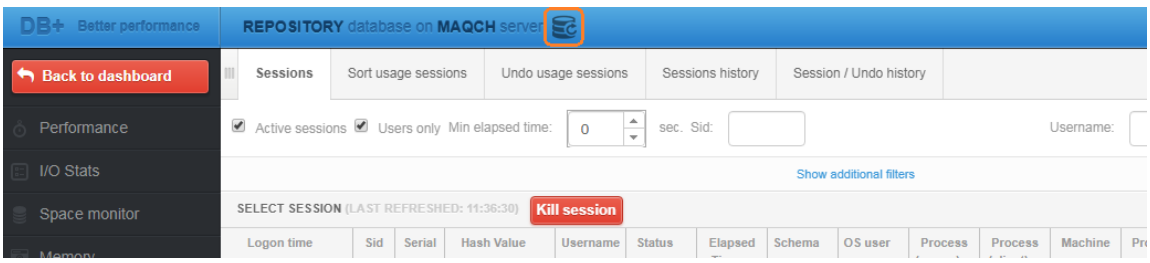
The following chart presents the new version of the system:



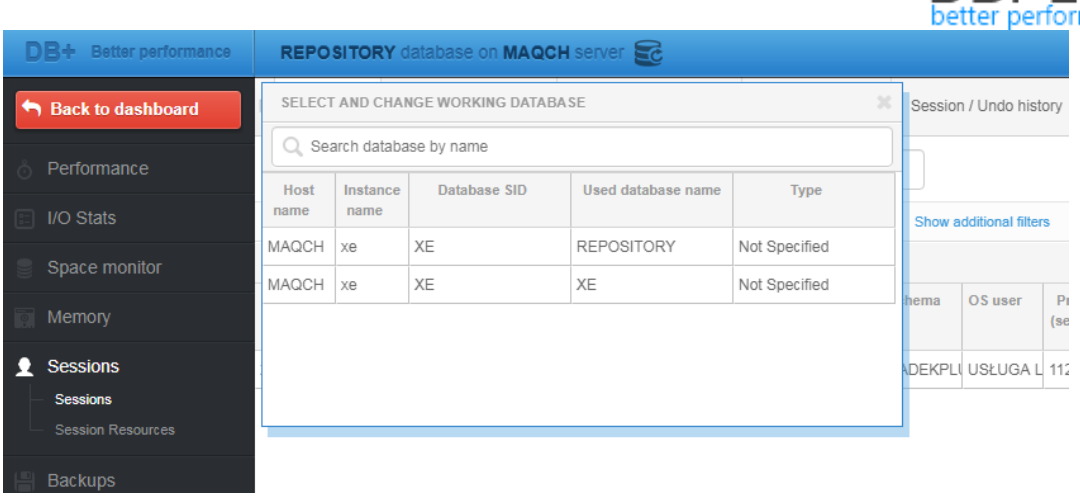
1.2 *The capability to change the database in the Database Analysis module*

Upon entering the Performance module of the system through ***Database Analysis*** on the upper bar of the screen, identifiers of a selected database show up.

A functionality was added here, which allows switching between monitored databases.



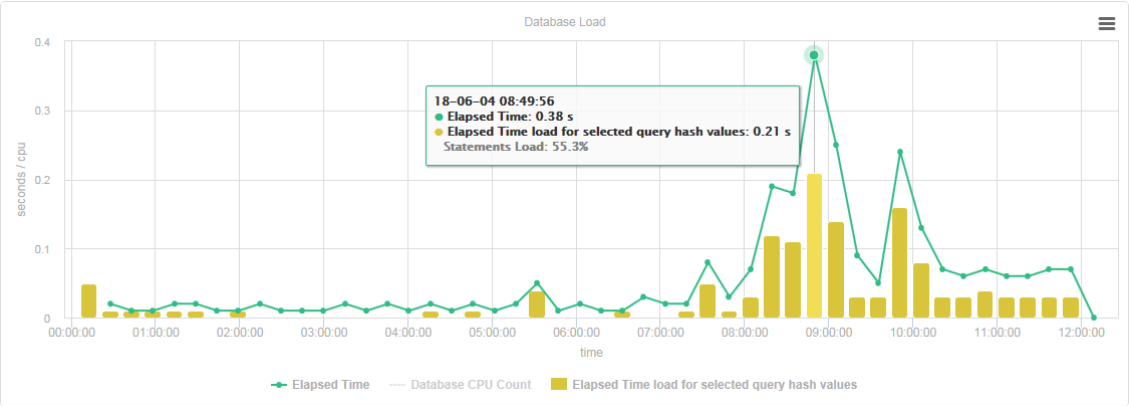
Clicking on the “database” icon results in the display of a table with monitored databases:



After switching databases, the system remains in the same screen. The option improves system ergonomics, and, in particular, allows rapid assessment of certain indicators/parameters in selected databases.

1.3 *Change in Sql Analyze*

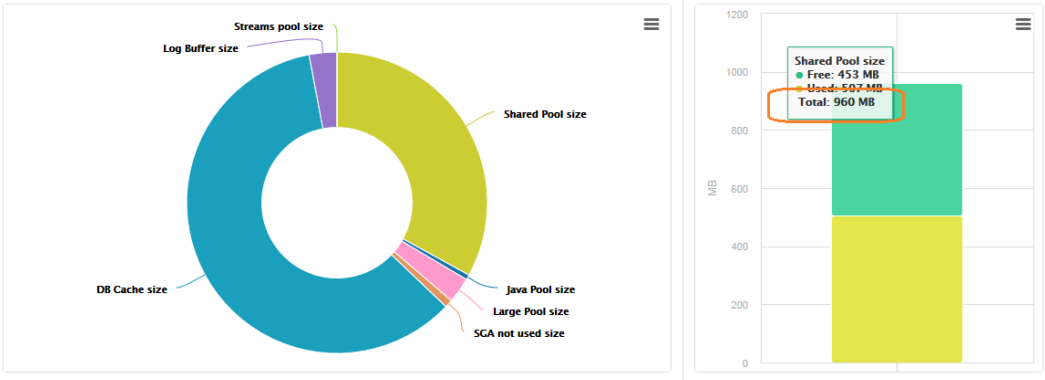
An additional % indicator displaying the share of selected queries in relation to load was added to the Sql Analyze module. The information is available after hovering the cursor over the chart area.



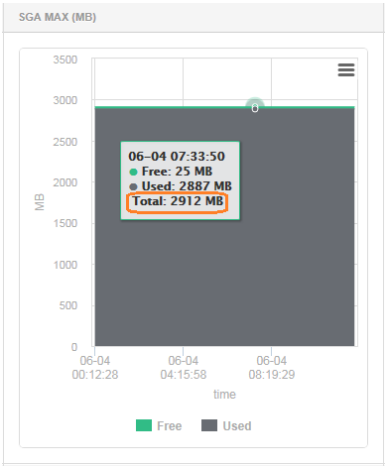
1.4 *Improvement in Memory tab*

An additional summary indicator was added to charts displaying occupied and free memory space.

This summary is visible, among others, in the SGA tab, after clicking on the Shared Pool size field.



Below is an example from the SGA History tab for an SGA MAX chart.



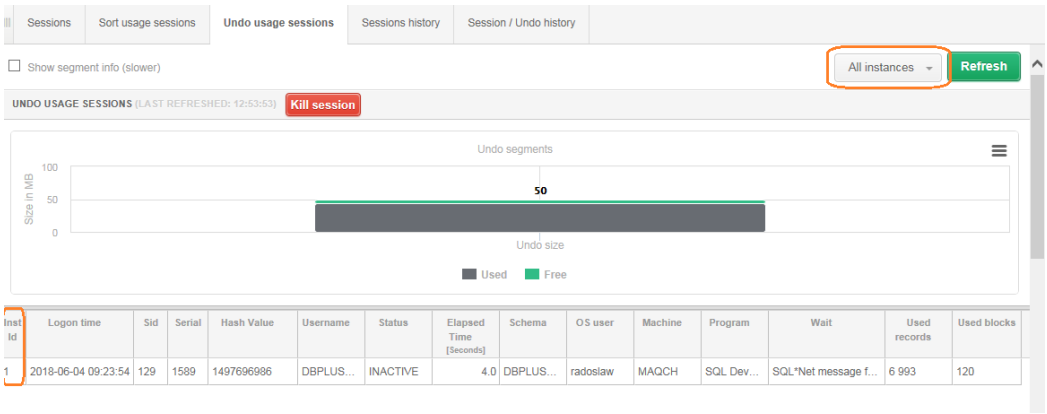
1.5 *Session view*

In RAC type databases in all tabs of the Sessions screen, namely:

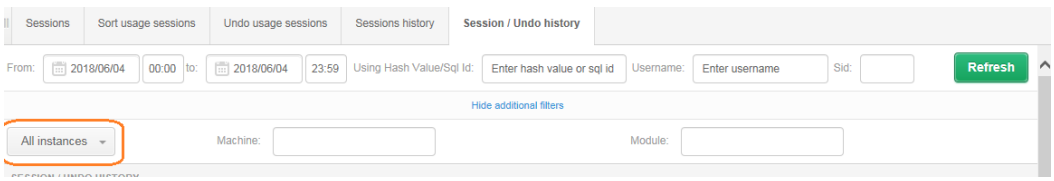
- Sessions
- Sort usage session
- Undo usage session
- Session History

the results and filters now have a field with instance identifier (previously only visible in the first tab).

Below is an example of the Undo usage session tab:



Below is an example of the Session / Undo history tab:



Adding a filter allows displaying the session for a designated database instance.

Additionally, **upon the first entry** to Sessions screen there was a problem with displaying the session for the wrong instance – only after clicking the Refresh button the system displayed sessions for the current database – this inconvenience was fixed.

1.6 *History screen of active sessions and UNDO using sessions*

In the History screen of active sessions and sessions using UNDO space, cumulative indicators for monitored sessions were added:

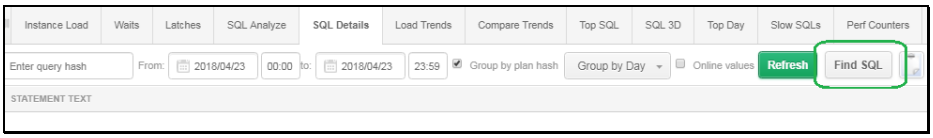
In the main screen, the following information was added:

- Number of sessions using UNDO space
- Number of records/changes in UNDO
- Size of the changes in UNDO

Logdate	Active Sessions	Undo Usage Sessions	Undo Used Record Count	Undo Used Blocks Count [Blocks]
2018/06/04 13:29:50	116	2101	121333	3 848
2018/06/04 13:28:44	138	2117	138342	4 303
2018/06/04 13:27:37	124	2147	120759	3 881
2018/06/04 13:26:30	131	2120	127985	3 930
2018/06/04 13:25:20	124	2099	111907	3 701
2018/06/04 13:24:14	132	2120	135776	4 378
2018/06/04 13:23:08	107	2094	110909	3 694
2018/06/04 13:22:01	137	2099	120954	3 828

1.7 *Improvements in the SQL Find option*

The query search module, SQL Find, can be found in SQL Details screen.



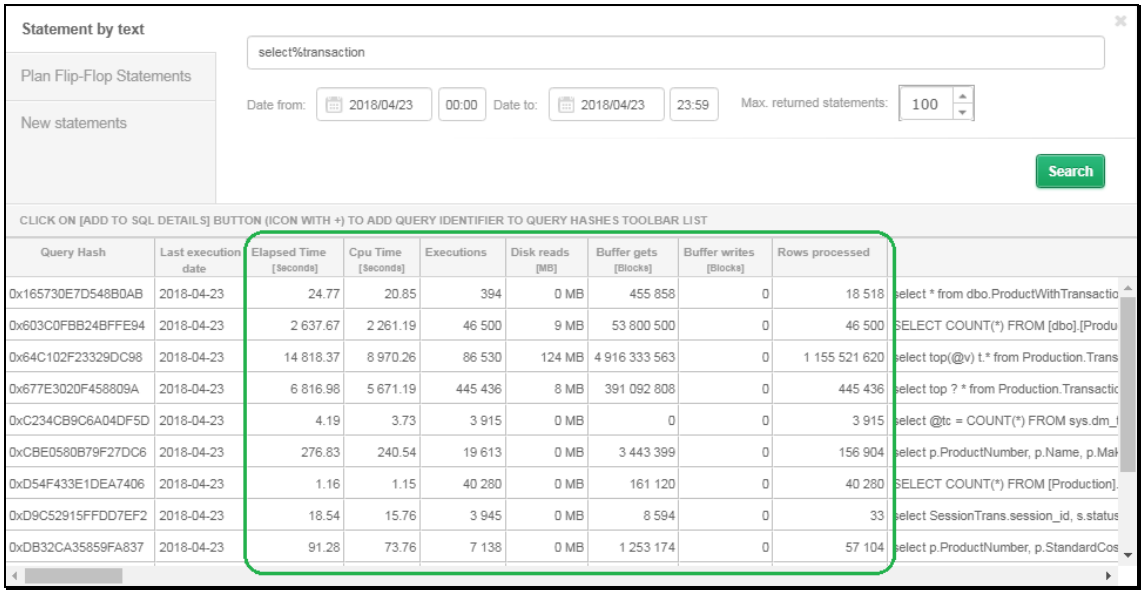
The following improvements were added to this option:

1.7.1 Displaying additional statistics for searched queries

The following information was added to every tab:

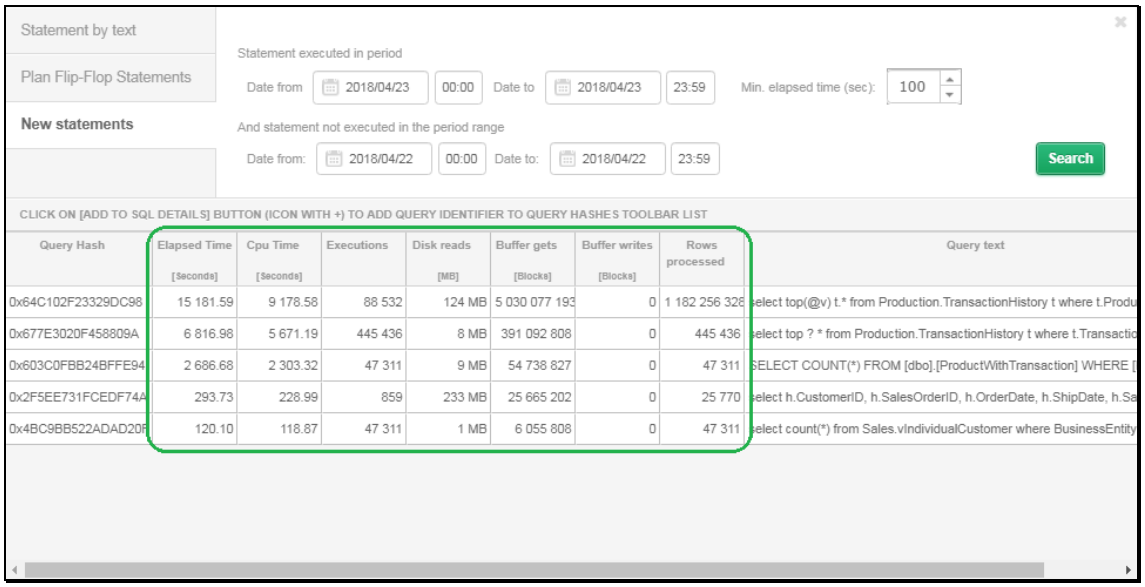
- Query duration time / Elapsed Time
- Virtual processor use time / Cpu Time
- Number of executions
- Number of read blocks:
  - from drive devices
  - from memory
- Number of returned records

Presented below is the result of an example search by query text:



Query Hash	Last execution date	Elapsed Time [Seconds]	Cpu Time [Seconds]	Executions	Disk reads [MB]	Buffer gets [Blocks]	Buffer writes [Blocks]	Rows processed	
0x165730E7D548B0AB	2018-04-23	24.77	20.85	394	0 MB	455 858	0	18 518	elect * from dbo.ProductWithTransactio
0x603C0FBB24BFFE94	2018-04-23	2 637.67	2 261.19	46 500	9 MB	53 800 500	0	46 500	ELECT COUNT(*) FROM [dbo].[Produ
0x64C102F23329DC98	2018-04-23	14 818.37	8 970.26	86 530	124 MB	4 916 333 563	0	1 155 521 620	elect top(@v) t.* from Production.Trans
0x677E3020F458809A	2018-04-23	6 816.98	5 671.19	445 436	8 MB	391 092 808	0	445 436	elect top ? * from Production.Transactio
0xC234CB9C6A04DF5D	2018-04-23	4.19	3.73	3 915	0 MB	0	0	3 915	elect @tc = COUNT(*) FROM sys.dm_t
0xCBE0580B79F27DC6	2018-04-23	276.83	240.54	19 613	0 MB	3 443 399	0	156 904	elect p.ProductNumber, p.Name, p.Mak
0xD54F433E1DEA7406	2018-04-23	1.16	1.15	40 280	0 MB	161 120	0	40 280	ELECT COUNT(*) FROM [Production].
0xD9C52915FFDD7EF2	2018-04-23	18.54	15.76	3 945	0 MB	8 594	0	33	elect SessionTrans.session_id, s.status
0xDB32CA35859FA837	2018-04-23	91.28	73.76	7 138	0 MB	1 253 174	0	57 104	elect p.ProductNumber, p.StandardCos

Presented below is the result of an example search of queries executed on a certain day but not executed on the previous day:



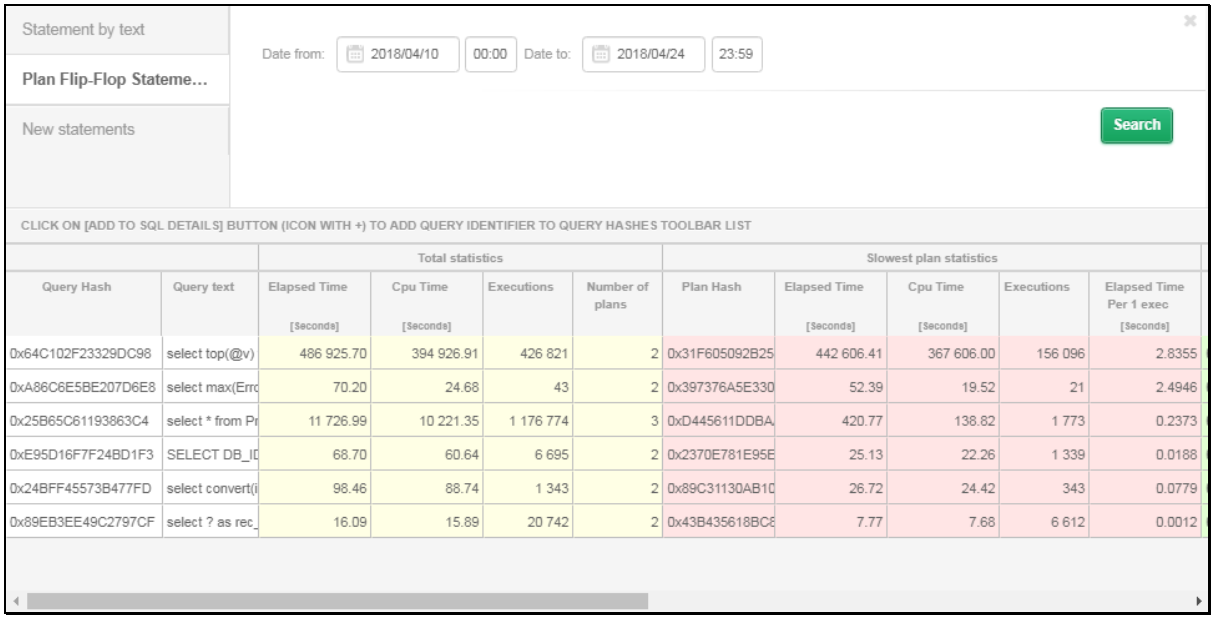
1.7.2 Improvements in query analyses, which change the execution plan

For queries changing the execution plan, additional information grouped in accordance with the areas below were added:

- Statistics with a summary for all execution plans where the query was active
- Statistics with a summary for the slowest plan
- Statistics with a summary for the fastest plan
- Comparison of the slowest and the fastest
- Estimation of a possible reduction in the query duration time

Presented below is an example with a search result of those queries, which changed the execution plan within the period of two weeks:

View of areas: *Total statistics, Slowest plan statistics*



View of areas: *Fastest plan statistics, Slowest vs. Fastest, Estimation statistics.*

	Fastest plan statistics					Slowest vs Fastest		Estimation statistics	
Elapsed Time Per 1 exec [Seconds]	Plan Hash	Elapsed Time [Seconds]	Cpu Time [Seconds]	Executions	Elapsed Time Per 1 exec [Seconds]	Times faster	Elapsed Time Per 1 exec difference [Seconds]	Elapsed Time to reduce [Seconds]	Cpu Time to reduce [Seconds]
2.8355	0xF02EB8B03876	44 319.29	27 320.91	270 725	0.1637	17	2.6718	417 052.5628	351 853.1681
2.4946	0xFE2C0C637B8	17.82	5.16	22	0.8098	3	1.6848	35.3808	14.5963
0.2373	0x90B998ECB7C	8 388.18	7 310.25	1 169 949	0.0072	33	0.2301	3 289.8811	2 868.4574
0.0188	0x43E66D931657	43.57	38.38	5 356	0.0081	2	0.0106	14.2387	12.6670
0.0779	0x2B459523C16C	71.73	64.33	1 000	0.0717	1	0.0062	2.1186	2.3535
0.0012	0xC99C4CF8765	8.32	8.21	14 130	0.0006	2	0.0006	3.8777	3.8421

A crucial area of the **Plan Flip-Flop Statements** screen is *Statistics estimation*. **Elapsed Time to reduce** and **Cpu Time to reduce** columns are a calculation of a possible duration reduction in cases when a query would be active only at the highest execution plan.

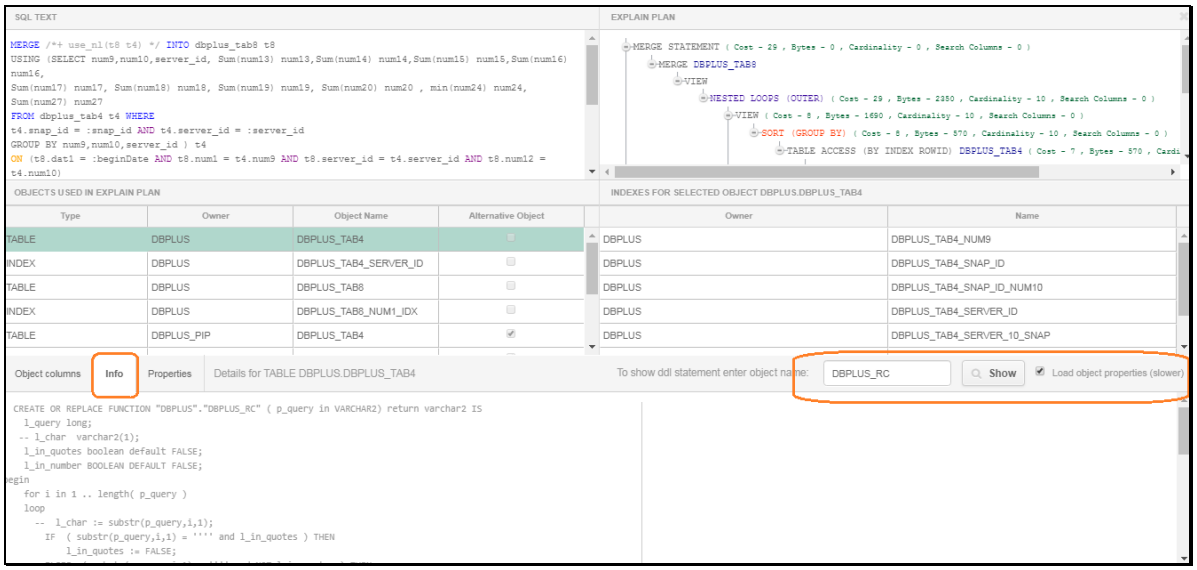
Helpful tip:

Sorting by one of these columns will allow finding those queries whose optimisation would result in the highest performance improvement.

1.8 *Improvement in Show Plan Objects*

In the Show Plan Objects screen, which allows the analysis of an execution plan, an option to display object definition was added.

The option is available after selecting the Load object properties filter and after choosing the Info tab.



1.9 *Updating Application architecture screen*

The screen available at the main menu level **Servers monitor -> Application architecture** was restructured and supplemented with additional information regarding process monitoring activity.

In the area to the left, some databases are available which display:

- When the last snapshot for the monitored ORACLE database was made
- The time of the most recent database activity (connection with monitoring service with ORACLE database)

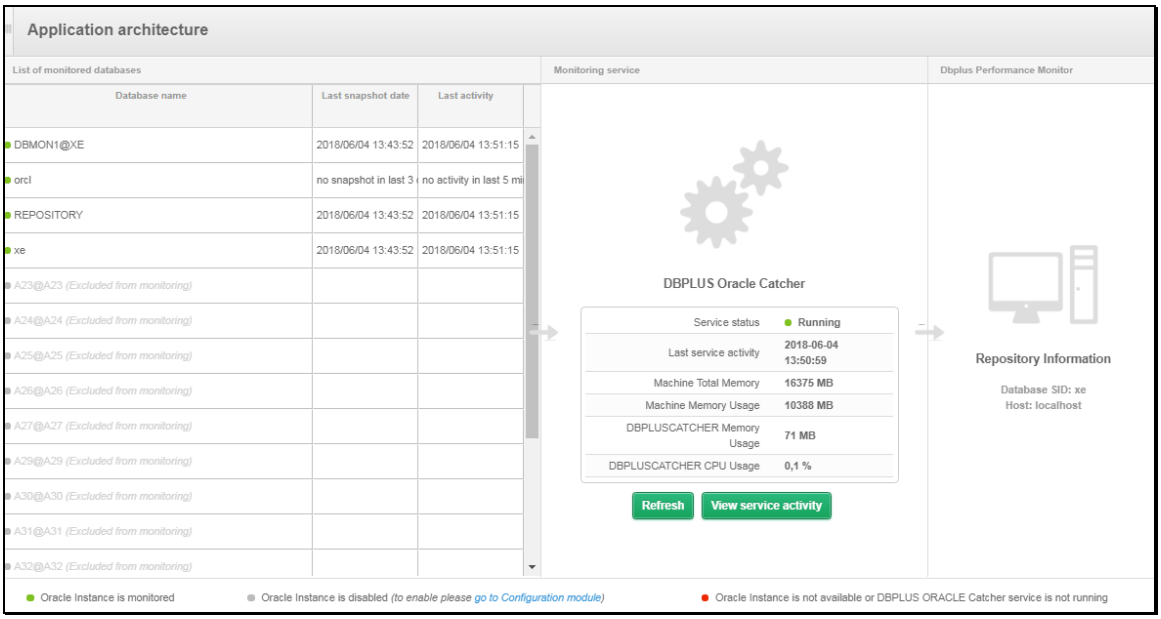
The central area contains information on the current state of DBPLUSORACLECATCHER monitoring service, which provides information such as:

- Whether the service is active
- The last activity of the service
- Memory use on a machine where the monitoring service is activated
- Processor usage by monitoring service

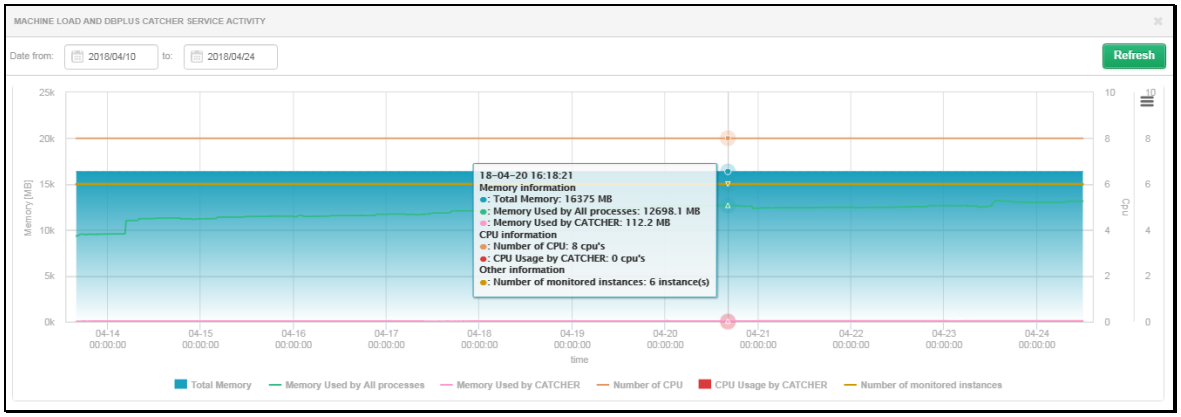
Below the statistics, the history of the service state can be checked for a selected time period.

The area on the right contains information on the SQL instance, where the repository of DBPLUS Performance Monitor system is located.

Below is an example slide:



The slide below displays the history of DBPLUSCATCHER service activity, after the **View service activity** button is clicked on:



1.10 *Changes in DBPLUSCATCHER monitoring service*

1.10.1 Problem with monitoring of query statistics

In the database version oracle 12, there was a problem with statistic monitoring for queries, which were removed from the cache and reappeared in v$sql system view.

The oracle database engine returns statistics with identical values, i.a., for columns Elapsed Time, CPU Time (default values are zero), which resulted in invalid reporting of query load.

The problem applied to version oracle 12 and occurred in 1-5 cases in every 1000 queries.

1.10.2 Implementation of a restructuring process for tables in Dashboard screen

A restructuring mechanism was implemented for selected tables used by the monitoring service. The process is launched once a week.

1.10.3 Statistics monitored at day level

For a query in table DBPLUS_TAB2_DAY launched with MERGE clause, a problem with changing the execution plan to a worse one occurred – the optimiser of the database used NESTED LOOP operator instead of HASH JOIN – the problem has been solved in the new version.

For Load Trends statistic a new data gathering mechanism by day was implemented – this is intended to, i.a., improve the operation rate of the performance trends screen.

1.10.4 Deleting history from a table storing lock history

The process of deleting history data from a table storing data from lock snapshots was made available.

For information purposes – the length of history by snapshots is by default retained for 30 days – the parameter can be configured in Configuration->Settings.

Because the table (i.e. DBPLUS_TAB22) was not previously cleaned, and to avoid multiple data deletion operations, the upgrade process has been restructured and preserves the history from the last 3 days.

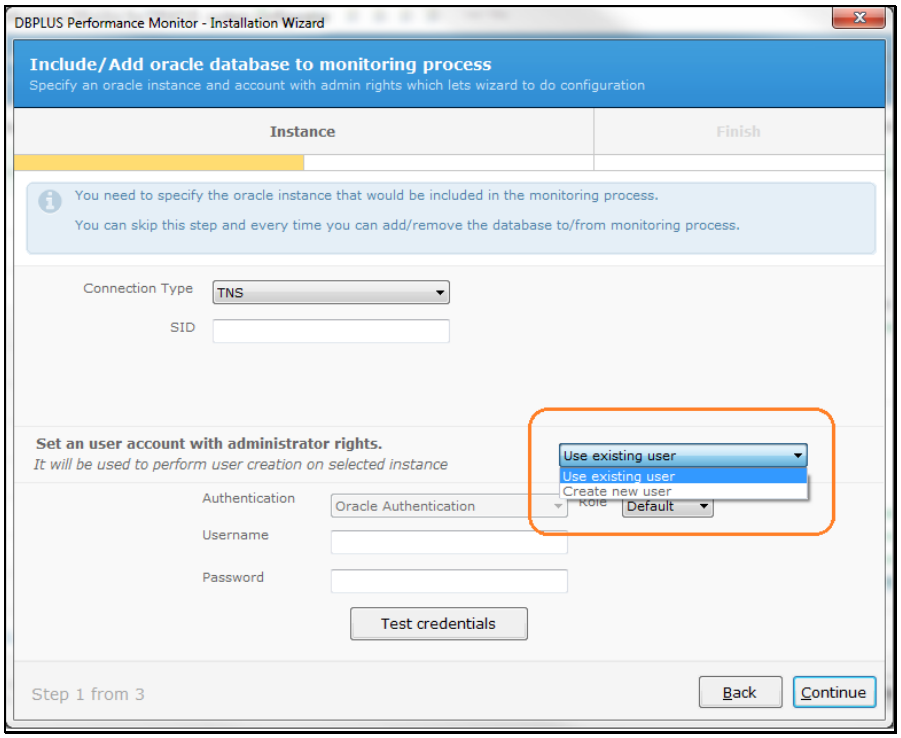
1.10.5 Slow operation of the use assessment process for UNDO, taking into account REUSE blocks

Database optimiser for the dba_undo_extents system view could use the wrong execution plan – HASH JOIN operator, which was not selected there – the problem has been solved.

1.11 *Changes in the configurator*

1.11.1 Adding a database to monitoring and permission verification

While adding a database to monitoring, the configurator allowed the use of an existing user, which was then used for monitoring purposes.



Upon verification, the permissions CONNECT and DBA_CATALOG_ROLE were tested directly on the user. In the case when a user had an added role with such permissions, the mechanism did not allow the use of such an account – the problem has been solved in the new version.

1.11.2 User name verification

While adding a database to monitoring there was a problem when a user name began with numbers, and the configurator did not allow the use of such an account – the problem has been solved.

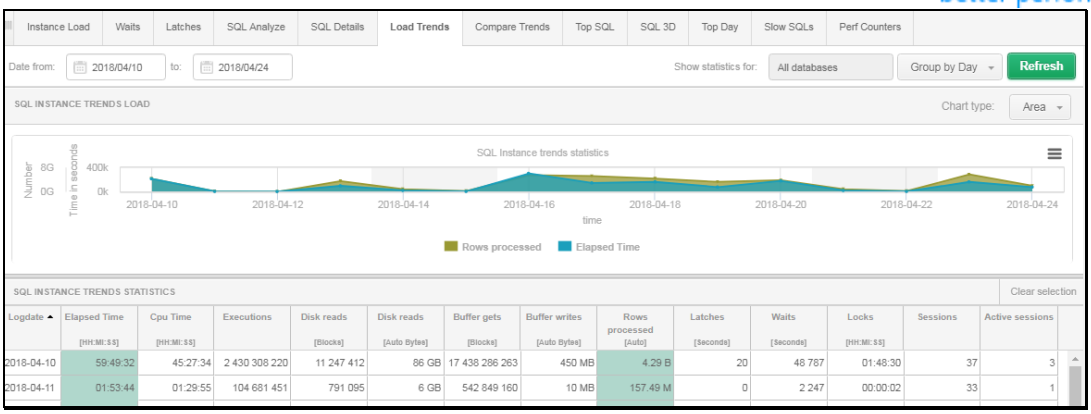
1.12 *General optimisation*

1.12.1 Changing size/height of charts

In screens such as

- Instance Load
- Waits
- Latches
- Sql Analyze
- Load Trends
- Performance Counters
- IO Stats
- Space Monitor

There is now an option to change the height of the chart – an example with a scaled chart in Load Trends screen is presented below:



1.12.2 Detecting problems with non-functioning monitoring

A mechanism of problem detection in monitoring service operation was improved in the system – a very common occurrence was the lack of space in the repository database and all information regarding service operation errors were placed in the log file on a machine with DBPLUS Performance Monitor software.

In the new version, the dashboard screen now displays an alert in cases such as

- problem with insufficient space in the repository or UNDO space
- stopped monitoring service
- lack of resources on the machine with monitoring service

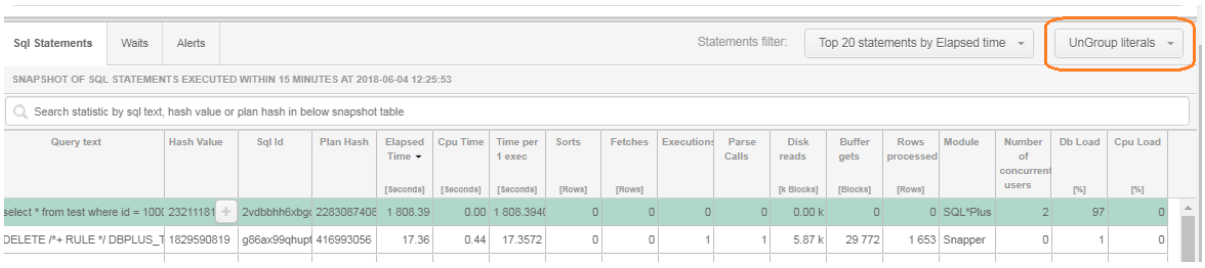
Additionally, current data from the activity of DBPLUSORACLECTCHER service can be displayed in screen **Servers monitor->Application architecture**.

1.12.3 Improper sorting in Slow SQL screen

An error with the default sorting in Slow SQL functionality was fixed in the system. In the new version, after the query statistic for a selected period is displayed, the table is by default ordered by Elapsed Time column (descending sorting).

1.12.4 Group Literals/Ungroup literals filter in Database Load, Slow Select screens

In the selected screens there is a filter for activating or deactivating query grouping for the presence of literals.



The activity of the filter was opposite than selected in the option – this has been fixed.

1.12.5 Sql Details – displaying with an option without grouping by period and filter by hours

In Sql Details screens, if the following filters were selected:

- No group by period

- Filter setting in hour range, e.g. from 08:00 to 10:00

The system ignored the hour range and displayed statistics for the full day – this problem has been fixed.

1.12.6 Latches screen – lack of calculated waiting times per second

In the Latches screen, after clicking on a snapshot on the chart on the right side, Latch type waiting times are displayed.

The chart displayed waiting times for the total time which were not expressed per 1 second. In the new version it was corrected, as it is in the Waits screen.

1.12.3 Backups screen

In the backups screen (copies done via RMAN) there was a problem with building the chart and the capability of displaying details – this problem has been solved.